REMARKS

Claims 7 to 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sabol et al. (U.S. 4,649,023) in view of Rebeyrolle et al. (U.S. 5,832,050). Claims 7 to 12 were rejected on the ground of nonstatuatory obviousness-type double patenting as being unpatentable over claims 13 to 16 of copending Application No. 10/885,927. Claims 7 to 12 were rejected on the ground of nonstatuatory obviousness-type double patenting as being unpatentable over claim 9 of U.S. Patent No. 6,863,745.

Claims 7, 8, 9, 10, 11 and 12 have been amended.

Reconsideration of the application based on the following remarks is respectfully requested.

Minor Amendments

Claims 7 to 12 have been amended for informalities but not as to scope and do not require any new search.

35 U.S.C. 103(a) Rejections

Claims 7 to 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sabol et al. (U.S. 4,649,023) in view of Rebeyrolle et al. (U.S. 5,832,050).

Sabol et al. discloses a process for fabricating a zirconium-nobium alloy. "The alloys are beta-quenched and subsequently treated at lower temperatures than normal annealing temperatures and fabricating steps. In formation of tubing, for example, the beta-quenched alloy is extruded at a temperature at or below 650°C and between subsequent cold working steps, the article is subjected to cold working anneals at a temperature at or below 650°C. The resultant article is given a final anneal at a temperature also below 650°C, and preferably around 500°C." (Column 2, lines 16 to 24).

Rebeyrolle et al. discloses "zirconium-based alloy for the manufacture of elements used in a nuclear reactor and to the elements produced from this alloy." (Column 1, lines 6 to 8).

Claim 7 has been amended to recite, "a method of manufacturing tubes intended for making all or the external part of a sheathing tube for a nuclear fuel rod or a guide tube for a nuclear fuel assembly, comprising:

forming a bar of a zirconium based alloy which also contains;

0.03 to 0.25% in total firstly of iron;

secondly, at least one of the elements selected from the group consisting of chromium and vanadium;

0.8 to 1.3% of niobium;

less than 2000 ppm of tin;

500 to 2000 ppm of oxygen;

less than 100 ppm of carbon;

5 to 35 ppm of sulfur; and

less than 50 ppm of silicon;

quenching the bar in water after heating to between 1000° and 1200°C;

extruding a blank after heating to a temperature of between 600°C and 800°C;

cold-rolling said blank in at least four passes to obtain a tube, with intermediate heat treatments between 560°C and 620°C; and

applying a final heat treatment between 560°C and 620°C, all the heat treatments being applied in an inert atmosphere or under vacuum."

Neither Sabol et al. nor Rebeyrolle et al. teach or show "all the heat treatments being applied in an inert atmosphere or under vacuum," as recited in claim 7, and the Office Action fails to address this claim limitation at all. Furthermore, there is no motivation to combine the sulfur of Rebeyrolle with Sabol.

Withdrawal of the rejection of independent claim 7 under 35 U.S.C. §103(a) and dependent claims 8 to 12 is respectfully requested.

Furthermore, with regards to claims 9 and 10, Cr, Mo, V, Cu, Ni and W cannot be considered as completely equivalent to Fe as for their effects on the properties of the alloys. Cr is not equivalent to Fe in that it causes significant changes in the intermetallic phase $Zr(Nb, Fe, Cr)_2$, which can lead to some lowering of the corrosion resistance if the Cr content is too high (over 250 ppm). For a Fe/Cr ratio about 30, corrosion at 400°C in water is not much affected by Cr. But generally speaking the corrosion resistance at 400°C is better if the ratio Fe/(Cr+V) is high. (See specification page 4, line 27 to page 5, line 8). So it cannot be said that Cr and Fe would be replaceable by each other. It is respectfully submitted that if Cr and Fe were replaceable by one another (which the applicant does not agree with) there would

be no need to optimize the Fe/Cr ratio as in claims 9 and 10, only the sum Fe+Cr should have to be considered.

Also, V has a marked effect on the hydrogen absorption by the alloy. Replacing some of the Fe by V, up to 25% of V, causes a delay in the recrystallization and a slight reduction of the grain size. The density of the intermetallic compounds is diminished and their composition is modified. A consequence is that an increase in V is somewhat detrimental to all kinds of corrosion. But in some instances, in particular at the highest temperatures, hydrogen absorption is diminished by the presence of V, so that one of the main drawbacks of Zr-1%Nb alloys can be attenuated.

Concerning Ni and Cu, they do not form the same precipitates as Cr and Fe. They form $Zr_2(Fe,Ni)$ or $Zr_2(Fe,Cu)$. Mo has a behavior comparable to Cr.

In view of this, it is furthermore respectfully submitted that one of skill in the art would not have modified Sabol net al. in view of Rebeyrolle et al., because the concentrations of Sabol are specifically to that alloy and altering such alloy can alter the properties derived by Sabol.

Claims 7 to 12 were rejected on the ground of nonstatuatory obviousness-type double patenting as being unpatentable over claims 13 to 16 of copending Application No. 10/885,927.

This obviousness-type double patenting rejection has been noted by the Applicants. If these provisional double patenting rejections are the only remaining rejections upon entry of the present amendment, then in accordance with M.P.E.P. §804.I.B.1, applicants would request withdrawing these provisional rejections.

Withdrawal of the rejection of independent claim 7 on the ground of nonstatuatory obviousness-type double patenting and dependent claims 8 to 12 is respectfully requested

Claims 7 to 12 were rejected on the ground of nonstatuatory obviousness-type double patenting as being unpatentable over claim 9 of U.S. Patent No. 6,863,745.

A terminal disclaimer is attached hereto.

Withdrawal of the rejection of independent claim 7 on the ground of nonstatuatory obviousness-type double patenting as being unpatentable and dependent claims 8 to 12 is respectfully requested.

CONCLUSION

It is respectfully submitted that the application is in condition for allowance and applicants respectfully request such action.

If any additional fees are deemed to be due at this time, the Assistant Commissioner is authorized to charge payment of the same to Deposit Account No. 50-0552.

Respectfully submitted,

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